CLAIMS

WHAT IS CLAIMED IS:

1. A glow discharge emission spectroscope analysis apparatus having a glow discharge chamber with an anode comprising:

a holding member for mounting a sample to be analyzed in operative contact with the glow discharge chamber;

an inert gas is positioned in contact with a surface of the sample under a pressure condition to enable a sputtering in the glow discharge chamber;

a power source of one of a high frequency voltage and a DC voltage is provided to the glow discharge chamber; and

means for mounting the sample at the same potential of a negative side of the power source so that the sample performs as a cathode to the anode of the glow discharge chamber and a glow discharge is emitted from the sputtering effect of the plasma on the sample; and

means for analyzing the emission from the glow discharge.

2. A glow discharge emission spectroscopic analysis apparatus according to Claim 1 wherein the inert gas is one of argon, neon, helium and a mixture thereof.

3. A glow discharge emission spectroscopic analysis apparatus according to Claim 1 wherein means for maintaining the sample at the same potential as that of a negative side of said high-frequency voltage or DC voltage is a metallic flat member.

4. A glow discharge emission spectroscopic analysis apparatus according to Claim 1 wherein the flat member is tightly attached to the surface of the sample.

5. In a glow discharge spectrometer for generating a glow discharge by arranging a sample to face an anode of a glow discharge tube provided in a Faraday cage with inert gas adjacent a surface of the sample under low pressure condition and high frequency voltage or DC voltage applied between the sample and the anode, for analyzing the glow discharge generated, the glow discharge spectrometer improvement comprising:

a first and second conductor member movably mounted to receive a sample therebetween;

a force assembly for pressing the sample to seal against the glow discharge tube; and

an electrical connector for providing a common electrical potential to the first and second conductors so that the sample acts as a cathode at a uniform potential.

6. The invention of Claim 5, wherein one conductor member has an aperture to accommodate a portion of the sample that is to be analyzed.

7. The invention of Claim 5, wherein the force member is a cylinder rod.

8. The invention of Claim 5, wherein the force member is a pair of cylinder rods.

9. The invention of Claim 5, wherein the electrical connector is a wiper member.

10. The invention of Claim 5, wherein one of the conductor members is resiliently mounted to permit adjustable movement between the conductor member and the sample when the sample is mounted between the first and second conductor members.

11. The invention of Claim 5 further including means for applying a pressurizing force to a surface of the sample opposite the anode for sealing the sample to the glow discharge tube.

12. A method of analyzing a semiconductor wafer, comprising the steps of:

positioning a semiconductor wafer between a first and second conductor member, the first conductor has an aperture to expose a surface of the wafer and the second conductor has a corresponding section to the opposite aperture for exerting a sealing force;

closing the first and second conductor to secure the semiconductor wafer;

positioning the exposed surface of the semiconductor wafer to an opening in a glow discharge chamber;

applying a force to seal the semiconductor wafer to the glow discharge chamber;

providing a sputtering gas to the glow discharge chamber;

applying an electrical potential to the semiconductor wafer through the first and second conductors to create a uniform negative potential of sufficient magnitude to cause a plasma of the sputtering gas to erode the semiconductor wafer; and

analyzing the glow discharge emission of light to determine the elements in the semiconductor wafer.

13. The method of Claim 12 further including resiliently mounting at least one of the first and second conductor members so that the semiconductor wafer is resiliently mounted upon closing of the first and second conductor member.

14. The method of Claim 12 further including applying a negative high frequency voltage

15. The method of Claim 12 further closing the first and second conductors with air pressure.

16. An apparatus for determining the elements in a semiconductor wafer, comprising:

a first conductor member having a central aperture and of a size larger than the wafer;

a second conductor member of a size larger than the wafer;

means for opening and closing the first and second conductor members to mount the wafer therebetween;

a glow discharge chamber apparatus having an opening adjacent the central aperture of the first conductor member and an anode within the chamber;

means for exerting a force on the wafer to seal the wafer to the glow discharge chamber apparatus opening when the wafer is mounted between the first and second conductors;

means for providing a sputtering gas to the glow discharge chamber apparatus;

means for providing an electrical charge between the first and second conductor s to uniformly charge the wafer as a cathode to the anode whereby a glow discharge emission is created as the wafer is sputtered; and

means for providing a spectroscopic analysis of the light from the glow discharge emission to determine the elements in the wafer.